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Study on comprehensive utilization model of rural low-carbon residential buildings in North China

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The background of this research is that now under the dual pressure of the energy crisis and environmental pollution, how to effectively improve the accommodation of the farmers? The double insulation and energy saving residential building wall technology and carbon fiber heating technology were integrated. The heating mechanism of new carbon fiber electric heating soft board was explored. On the basis of the study of the electrical and thermal properties of carbon fiber electric heating soft board, the performance of carbon fiber electric heating soft board used in the low temperature floor radiant heating system in North China in the new energy demonstration room of Shenyang Agricultural University was studied. A kind of system for solar energy water heater and heat storage is provided. It is realized that it is the heating mode of rural low carbon environmental protection. On this basis of the heating and cooling, control equation and the heat balance equation for the floor surface were set up. The influence of temperature fluctuation characteristics of a certain power of Carbon Fiber Electric Heating Soft Board, on which the temperature fluctuation of temperature control room is analyzed. Through the study of the analysis and simulation test of the power quality disturbance in the household wind-photovoltaic complementary power generation system, the technical support can be provided for further disturbance suppression and regulation for the household wind-photovoltaic complementary power generation system. In the distributed power with grid-connected performance analysis, the evaluation model of social cost and benefit of power supply enterprises is provided. Examples of Wiring Modes of Rural Low - carbon Residential Photovoltaic Power Supply is shown in Figure 1. Construction of demonstration project is completed, currently accumulated demonstration households is 2418 square meters.

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Quantification of the passive electrode effect explaining reversible capacity rise and decline during ageing of automotive lithium-ion batteries

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Batteries have become more and more important especially in the automotive sector. To increase lifetime and decrease costs, the loss of capacity needs to be well understood and separated in reversible and irreversible losses. State-of-the-art lithium-ion batteries that are currently employed in electric vehicles exhibit an overhang of the anode compared to the cathode to prevent lithium plating at the edges of the anode. The percentage ratio of this overhang to the active anode is in the order of 5-10% for pouch, prismatic or cylindrical cells. In our previous publication, we could show that a potential difference between the overhang and the active anode is leading to a flow of active lithium slowly counterbalancing the potentials. Thus, the extractable capacity is rising or declining depending on the difference of the SOC prior to begin the test and the test SOC. With this knowledge, the reversible loss or gain of capacity can be separated from irreversible losses by simple linear extrapolation. The different SOC of the active anode and the overhang of the anode are visualized by Gyenes *et al.* in a post-mortem-study. In his PhD thesis Johannes Schmalstieg could model the lithium-flow from and to not directly chargeable parts of the anode. Unfortunately in literature the passive electrode effect is not known and capacity trends are misinterpreted. Thus, calendaric aging is fitted with a square root function although the irreversible aging follows a rather linear trend. Furthermore relaxation effects are reported where the capacity is increasing when it is repeated. With the theory of passive electrode effect, all these observations get explainable with a high storage SOC and a low SOC prior to begin of test. In this presentation, a quantification of the passive electrode effect will be shown for three different automotive cells with different cell designs.

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